



## Parabolic Flight Campaign February 2013

**Campaign Dates: February 25- March 1, 2013**

**Total payloads: 6**

**Parabolas: Zero Gravity, Martian & Lunar**



#	Title	PI/Organization	Description/Objective
1	Portable Fire Fighting Extinguisher X002-P	NASA JSC	Flight share payload. These zero-g tests will validate in microgravity a new PFE using FWM and nitrogen for replacement of the current CO <sub>2</sub> PFEs onboard the ISS. CO <sub>2</sub> at fire suppression levels is toxic in occupied spaces. As a result, ISS crew safety will be appreciably improved during fire emergency operations..
2	Gene Expression 12-P	University of Florida	This flight opportunity will demonstrate imaging hardware functionality in low and elevated gravity environments. Potential users of the matured technology include biology researchers and medical professionals interested in the parabolic flight realm, as well as the suborbital flight community. biological samples will be imaged in real time during the parabolic flights. Fluorescent images will be compared to biochemical data collected during the flight from parallel samples. Expected flight data will evaluate the effects of the parabolic flight on the performance of the imagery and on the gene expression of the biological samples.
3	DNA Degradation 13-P	NASA KSC	This project is developing a miniaturized microfluidic (lab-on-a-chip) device that is designed to monitor DNA damage, in real-time, resulting from radiation exposure in space. The instrument under development will ultimately (a) use the Polymerase Chain Reaction (PCR) to amplify DNA, (b) use fluorescent imaging to monitor radiation induced changes in DNA composition, (c) initially fly on a nanosat and characterize its orbit by recirculating a reservoir of unshielded DNA and monitoring "cumulative" radiation-induced damage to the DNA over time, (d) subsequently be deployed on ISS in the NanoRack facility or an alternative platform.
4	MFEST 20-P	NASA JSC	The primary objectives of the parabolic flight campaign for MFEST are to conduct precursor testing of the integrated experiment in a simulated environment, to checkout the hardware and procedures prior to suborbital flight, and to obtain basic flow systems data in preparation for the suborbital flight(s). The primary objective of the suborbital flight for MFEST is to conduct a pathfinder, suborbital flight experiment that focuses on two-phase fluid flow and separator operations through a representative launch, suborbital, and entry profile.
5	Nanoscale Mixing 40-P	University of Puerto Rico	The Electrochemical Microgravity Laboratory (EML) is comprised of 2 major components: (a) Electronics Rack (ELR) to control the electrochemical operation and (b) Experimental Equipment Box (EEB) double contained Makrolon box safely containing the electrochemical cells (triple containment in overall). Test approaches developed to mitigate the decrease in catalytic current by: (1) inducing hydrodynamic turbulent mixing at three different flow rates; (2) the reengineering of the electrode geometry and pore structure by: (a) utilizing bulk electrolysis and (b) changing the pore size employing three different mesoporous carbon supports.
6	Fnirs 48-P	NASA GRC	These flights aim to inform headgear design and data processing methods, and verify instrumentation to prepare for IRB approval for future human subject tests. The flight data will include dynamic optical and mechanical measurements. Characterization of mechanical contributions to the optical signals will allow the determination of headgear design parameters to minimize contamination, while allowing their identification and removal